PATENT APPLICATION
GOS-22
HE-171

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Application of REINER RAFFEL ET AL.		: Art Unit: 1711
Serial No.:	10/656,346	: Examiner: John M. COONEY
Filed:	September 5, 2003	:
Title:	PROCESS FOR THE PRODUCTION OF VOID FREE, PINHOLE FREE POLYURETHANE BLOCK FOAM	: Date: April 28, 2008

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APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

S i r:

This Brief is an Appeal from the Final Action of the Examiner dated October 26, 2007 in which the rejection of Claims 1, 2, and 4-13 was maintained.

I. REAL PARTY IN INTEREST

Each of the named inventors assigned his rights to the invention claimed in this application to Hennecke GmbH. Hennecke GmbH is therefore the real party in interest in this Appeal.

II. RELATED APPEALS AND INTERFERENCES\

There are no pending appeals or interferences of which Appellants are aware that would be affected by or have a bearing on the Board's decision in this Appeal.

III. STATUS OF CLAIMS

Claims 1, 2, and 4-13 remain pending in this case and are the subject of this Appeal.

Claim 3 was cancelled in Appellants' response filed August 6, 2007.

No claims have been allowed.

No claims have been objected to.

No claims have been withdrawn from consideration.

IV. STATUS OF AMENDMENTS

No amendment to any of Claims 1, 2, and 4-13 has been made or requested subsequent to the Examiner's Final Action dated October 26, 2007.

V. SUMMARY OF THE INVENTION

The present invention is directed to a process and apparatus for continuous production of polyurethane foam where the steps of and devices for mixing the reaction components and generating bubble nuclei from the blowing agent are spatially separated (page 1, lines 2-5; page 3, lines 6-12 of the Specification).

In the process and apparatus claims, the reaction components of polyol, isocyanate and water (blowing agent) are metered into and mixed in a static mixer to form a reaction mixture (page 3, lines 28-31; page 7, line 6-7, lines 23-25).

Then, in a pressure reducing body which is downstream and spatially separate from the static mixer, the mixture is atomized to generate bubble nuclei (page 4, lines 1-3; page 6, lines 9-11; page 7, lines 16-21, lines 26-27).

Finally, in an adjustable throttle body, which is downstream of the pressure reduction body, the reaction mixture goes through a second pressure reduction step and a foam is formed (page 4, lines 6-8; page 6, lines 26-28; page 7, lines 27-28).

By decoupling of the mixing and nucleation, good mixing occurs without the negative influence of the bubble nuclei (page 7, line 6-7. 17-21).

VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

A. Claims 1, 2, and 4-13 are rejected under 35 U.S.C. 102(b) as anticipated by Althausen et al. (5,840,778).

B. Claims 1, 2, and 4-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Sulzbach et al. (5,643,970).

C. Claims 1, 2, and 4-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Sulzbach et al. (6,019,919).

D. Claims 1, 2, and 4-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Althausen et al. ('778) & Sulzbach et al. ('970 & '919), each taken individually.

E. Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rill, Jr. et al. (3,220,801) in view of Sulzbach et al. ('919).

F. Claims 1, 2, 4-13 are rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-18 of U.S. Patent No. 6,809,124.

VII. ARGUMENTS

A. Althausen et al.

Althausen et al. disclose a process and an apparatus for producing polyurethane foam wherein the polyurethane reaction mixture is passed through an opening extending over a length of at least 1mm in the direction of flow, thereby subjected the mixture to shear. The polyurethane reaction mixture is also passed through a sieve (see Claim 1).

Althausen et al. also teach that the carbon dioxide can be mixed with the polyol in a static mixer (column 5, line 20-27), before forming the reaction mixture in mixer 40 (column 9, lines 38-43).

Thus, Althausen et al. fail to teach metering the individual reaction components into a static mixer to form a reaction mixture, and the subsequent and spatially separate nucleation of the blowing agent.

Furthermore, Althausen et al. fail to teach a two-stage reduction of the pressure of the reaction mixture, i.e. using a pressure reducing body followed by a throttle body.

With respect to claim 10, it will be noted that the throttle body is recited as adjustable. Althausen does not teach an adjustable throttle body.

B. Sulzbach et al. '970

Sulzbach et al. '970 disclose a process and an apparatus for producing a polyurethane foam in which the polyurethane reaction mixture is passed through a flow channel, thereby subjected the mixture to shear. The polyurethane reaction mixture issuing from the flow channel passes through a means for reducing velocity, such as for example a baffle or screen (col. 4, lines 42-48).

Sulzbach et al. '970 also teach that the carbon dioxide can be mixed with the isocyanate in a static mixer (column 5, line 62 – column 6, line 3), before forming the reaction mixture in mixer 30 (column 7, lines 18-23)

Thus, Sulzbach et al. '970 fail to teach metering the individual reaction components into a static mixer to form a reaction mixture, and the subsequent and spatially separate nucleation of the blowing agent.

Furthermore, Sulzbach et al. '970 fail to teach either a two-stage reduction of the pressure of the reaction mixture, i.e. using a pressure reducing body followed by a throttle body; or an adjustable throttle body as recited in claim 10.

C. Sulzbach et al. '919

Sulzbach et al. '919 also teach that the reacting components are metered into a linear mixing chamber with a stirrer and subsequently flow into a foam producing device (column 6, line 8-12).

Sulzbach et al '919 also teach that carbon dioxide can be mixed with the polyol in a static mixer (column 5, lines 60-62) before forming gthe reaction mixture in mixer 3 (column 6, lines 14-17).

Thus, Sulzbach et al. '919 fail to teach metering the reaction components into a static mixer to form a reaction mixture, and the subsequent and spatially separate nucleation of the blowing agent.

Furthermore, Sulzbach et al. '919 fail to teach either a two-stage reduction of the pressure of the reaction mixture, i.e. using a pressure reducing body followed by a throttle body; or the use of an adjustable throttle body as recited in claim 10.

D. Althausen, Sulzbach '970 and Sulzbach '919, taken individually

All three references teach that the reacting components are metered into a mixing chamber with a stirrer, as noted above.

However, each of the references fails to teach metering the reaction components into a static mixer to form a reaction mixture, and the subsequent and spatially separate nucleation of the blowing agent.

Furthermore, none of these three references teach either a two-stage reduction of the pressure of the reaction mixture, i.e. using a pressure reducing body followed by a throttle body; or the use of an adjustable throttle body as recited in claim 10.

E. Rill et al. in combination with Sulzbach '919

Rill teaches that the reacting components are metered into a mixing chamber with a stirrer (column 3, lines 48-49, Fig. 1).

Thus, a combination of Rill and Sulzbach '919 fails to teach metering the reaction components into a static mixer to form a reaction mixture, and the subsequent and spatially separate nucleation of the blowing agent.

Furthermore, a combination of Rill and Sulzbach '919 fails to teach either a two-stage reduction of the pressure of the reaction mixture, i.e. using a pressure reducing body followed by a throttle body; or the adjustable throttle body of claim 10.

F. Double Patenting Rejection

The '124 patent claims a process to make a polyurethane foam.

In the first step of method claims 1-9 and in apparatus claims 10-13 in this application, a static mixer is required to be used to form the reaction mixture. In contrast, claims 1-18 of the '124 patent no static mixer is claimed to form the reaction mixture.

Static mixer 23 in figure 1 of the '124 patent can be used to premix the carbon dioxide and the polyol (column 5, lines 21-23) but pin mixer 1 is used to form the reaction mixture (column 5, lines 12-15). There is no suggestion that static mixer 23 can replace pin mixer 1 and form the reaction mixture.

Thus, claims 1-13 are patentably distinct from claims 1-18 of the '124 patent. However, Applicants confirm their previous offer to submit a terminal disclaimer upon the indication of allowable subject matter.

VIII. CONCLUSION

No reference alone or in combination teaches the process or an apparatus where first the reaction components are metered into a static mixer, mixed in the static mixer to form a reaction mixture; followed by a second step / device, spatially separate from the first step / device, for nucleation of the blowing agent; and finally a third step / device where a second pressure reduction is accomplished.

Respectfully submitted,

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IX. CLAIMS APPENDIX

Claim 1: A process for the continuous production of polyurethane foam from at least one polyol component and at least one isocyanate component in the presence of water as a blowing agent and optionally further additives, comprising the steps of:

metering into a mixing chamber of a static mixer and mixing therein at pressures of from about 3 to about 200 bar to form a polyurethane reaction mixture, the at least one polyol component, the at least one isocyanate component, the water and optionally the further additives;

generating bubble nuclei in the polyurethane reaction mixture by atomization thereof in a pressure-reduction body at pressures of from about 3 to about 200 bar, wherein the pressure is adjusted in the direction of flow downstream of the pressure-reduction body by a throttle body;

causing the polyurethane reaction mixture containing bubble nuclei to flow out through the throttle body; and

applying the polyurethane reaction mixture containing bubble nuclei to a substrate for foaming and curing.

Claim 2: The process according to Claim 1, wherein the mixing in the mixing chamber is performed at pressures of from about 5 to 200 bar and wherein the atomization is performed at pressures of from 5 to 200 bar.

Claim 4: The process according to Claim 1, wherein the pressure-reduction body comprises one or more nozzles or orifices.

Claim 5: The process according to Claim 4, wherein the cross-sectional area of the one or more nozzles or orifices openings is adjustable.

Claim 6: The process according to Claim 1, wherein the throttle body comprises a diaphragm valve or pinch valve.

Claim 7: The process according to Claim 1, wherein the maximum pressure between the pressure-reduction body and the throttle body is about 20 bar.

Claim 8: The process according to Claim 1, wherein at least one bubble nucleating agent is dissolved in the polyol component and/or the isocyanate component in the mixing chamber before the mixing.

Claim 9: The process according to Claim 1, wherein at least one bubble nucleating agent is injected into the mixing chamber and is dissolved there.

Claim 10: In an apparatus for the continuous production of polyurethane foam, comprising a static mixer having a mixing chamber and supply lines for the reaction components and a discharge opening for the polyurethane reaction mixture, the improvement comprising connecting a pressure-reduction body to the discharge opening and arranging an adjustable throttle body in the direction of flow downstream of the pressure-reduction body.

Claim 11: The apparatus according to Claim 10, wherein the pressure-reduction body comprises one or more nozzles or orifices.

Claim 12: The apparatus according to Claim 11, wherein the cross-sectional area of the one or more nozzles or orifices openings is adjustable.

Claim 13: The apparatus according to Claim 10, wherein the throttle body comprises a diaphragm valve or pinch valve.

X. EVIDENCE APPENDIX

None

XI. RELATED PROCEEDINGS APPENDIX

None